J. A. McHARDY & C. A. POTTER.

CARBURETER.

APPLICATION FILED SEPT. 10, 1908.

988,800. **Patented Apr. 4, 1911.**

2 SHEETS—SHEET 1.

Fig. 1

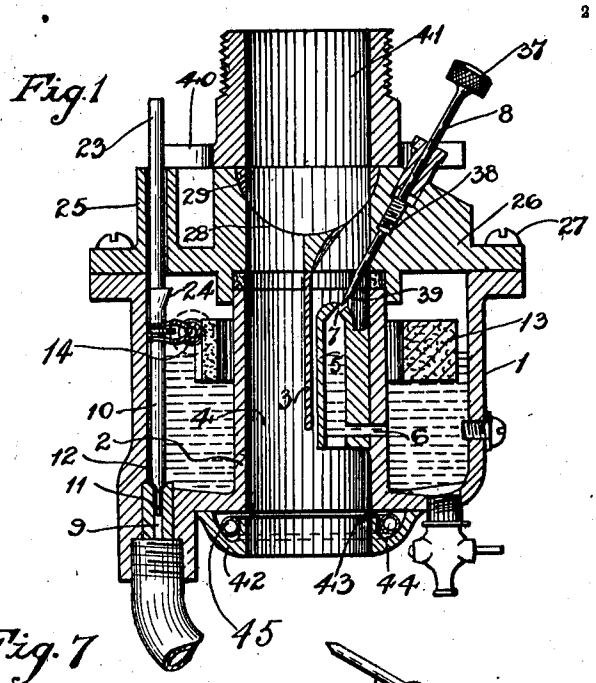


Fig. 7

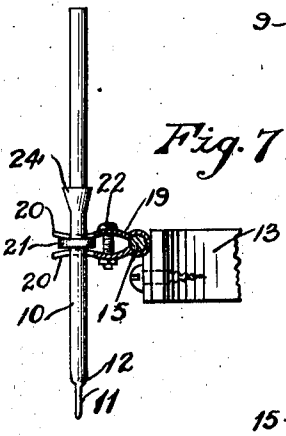
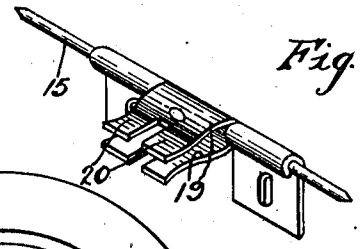


Fig. 6



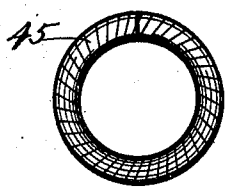


Fig. 9

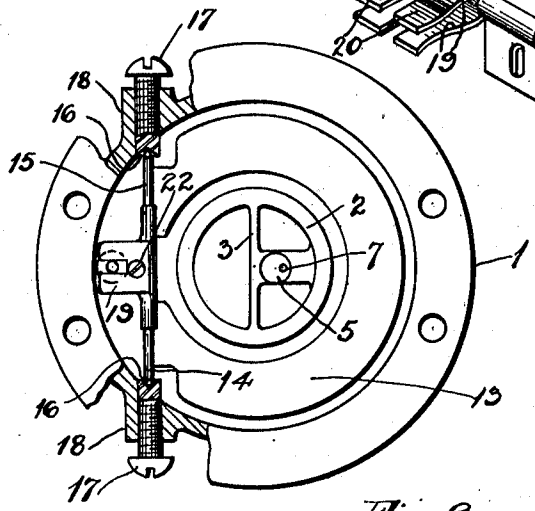


Fig. 2

WITNESSES

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2 SHEETS—SHEET 2.

Fig. 3

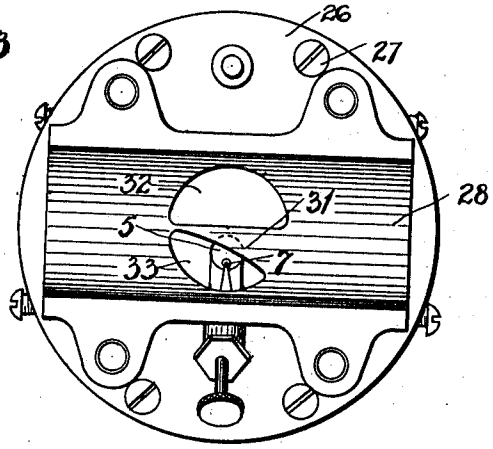


Fig. 4

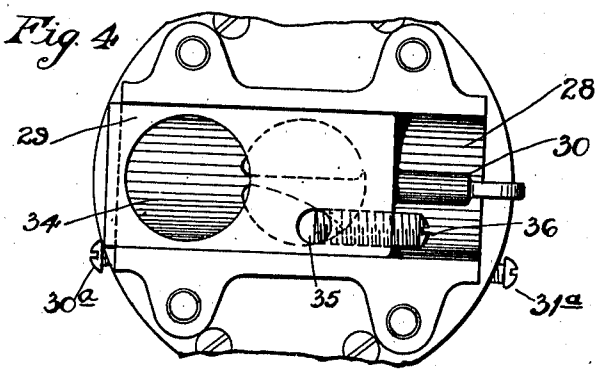
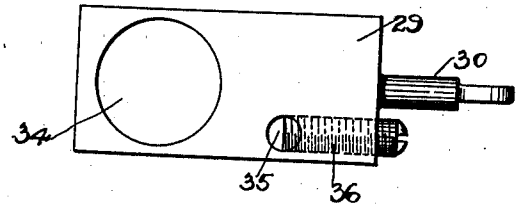


Fig. 5



WITNESSES

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Fig. 8

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UNITED STATES PATENT OFFICE.

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CARBURETER.

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Application filed September 10, 1908. Serial No. 452,503.

To all whom it may concern:

Be it known that we, JAMES A. McHARDY and CHARLES A. POTTER, citizens of the United States, residing at the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Carbureters, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to carbureters of the class employed for vaporizing hydrocarbon oil as it is fed to an internal combustion engine, and the object of the invention is to control the flow of the mixture through the carbureter and automatically increase or decrease the proportion of air at a predetermined ratio to the gas by the operation of a single valve.

It is an understood fact in the operation of motor car engines, that as the speed increases the percentage of gas required to economically operate the same decreases and the percentage of air increases in a given ratio, the reverse taking place as the speed is reduced, the slower the engine runs the richer the mixture required.

In carrying out our invention with the above in view, we have arranged an auxiliary air inlet and a vapor inlet side by side so that they may be controlled by one valve. The port in the vapor inlet is made substantially in a tapering form and arranged to exactly proportion the vapor to the amount of air admitted through the auxiliary air port, so that a proper and most economical mixture will be had at all times and at all speeds of the engine. An auxiliary aperture is also formed through the valve into the vapor port so that when the valve is nearly closed the engine will receive a mixture of sufficient richness to enable the same to run very slow. The size of this port may be controlled by an adjusting screw to suit different engines and to run under the varying conditions under which the same may be called upon to operate.

It is found in practice that when a car is running along on a slight angle or when going up or down hill, or when thrown from side to side in traveling rapidly over a rough road, that the float in the carbureter oftentimes becomes stuck and will not operate properly. To obviate this difficulty we have provided a long pivoting spindle of considerable length which has its bearings in adjustable screws located one in either side of the float chamber, by which construction it is impossible for the float under the most trying conditions to get out of alinement or become jammed in its bearings.

In order to facilitate the starting of the engine a circular feed well is formed around the mouth or lower portion of the draft flue so that when the float chamber is flooded by raising the inlet valve the gasolene will flow out of the supply nozzle, run down the side walls and fill up this circular well, whereby all of the air as it enters both ports in being drawn in to start the engine comes in contact with and becomes highly charged with the gasolene from the well, thus presenting a rich mixture to the cylinders enabling the same to start with great ease. After the engine is started the gasolene is sprayed into the entering air from the supply nozzle as it is being drawn into the cylinders.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings: Figure 1— is a central sectional side elevation of our improved carbureter. Fig. 2— is a top view of the float chamber with the top cap removed. Fig. 3— is a plan of the valve seat with the valve and retaining plate removed. Fig. 4— is a plan view of the valve seat with the valve in position thereon. Fig. 5— is a plan of the sliding valve. Fig. 6— is a detail showing the float hinge and yoke for engaging the inlet valve spindle. Fig. 7— is a detail showing a portion of the float and its connection to the valve spindle. Fig. 8— is an end view of the sliding valve. Fig. 9— is a detail of a tubular ring-shaped wire coil.

Referring to the drawings at 1 is a bowl-shaped float chamber, and 2 designates a pipe or tubular portion extending up through its center to form a draft flue. This flue is divided by means of the partition 3, one side 4 being entirely free for the admission of air, while in the opposite side is located the supply nozzle 5, which is attached to the wall of the tubular portion.

The lower end of this nozzle communicates through the passage 6 into the float chamber, the upper end being provided with a reduced outlet 7 into which a regulating needle 8 is adapted to fit so as to control the supply therefrom. The inlet passage 9 to the float chamber is controlled by a valve 12 carried by a spindle 10, the lower end of which is reduced at 11 to enter said inlet and form a guide, the upper portion of this spindle being supported in the guide boss 25. This spindle valve is actuated by means of a float 13, which may be constructed of cork, or any other suitable material, said float being pivoted at 14 on the hinge rod 15, which rod receives its bearings in the recesses 16—16 in the ends of the screws 17—17. These screws are threaded through bosses 18 in the sides of the float chamber and may be adjusted and set in the proper position and also regulated to take up the wear of the hinge rod so as to always insure a perfect working of the float. Another feature of this construction is that the hinge is so very long extending from side to side of the float chamber, that it is impossible for the same to get out of order or become jammed, or bound, so that the float will not work properly even when the car is tipped up at an acute angle when going along the side of a hill, or up and down steep inclines, or from any shock or jar which might be caused by rapidly running the car over rough roads.

A double armed yoke 19 constructed of thin material having forked ends 20 extends out laterally from the float to engage both the upper and lower faces of the collar 21 on the spindle 10, so that when the gasolene is at the required height in the float chamber the float will rise and close the valve 12 and prevent the gasolene from further entering the chamber only as fast as the same is drawn therefrom. A small bolt 22 is passed through these arms and is adapted to be set up to bring the arms together and take up the wear on the faces which work against said collar.

In priming the carbureter the upper end 23 of the valve spindle may be raised by the thumb and finger, the stop 24 serving to prevent an excess upward motion of the same. A cover plate or head 26 is secured to the upper portion of the float chamber by means of the screws 27, and in this plate is formed a channel or valve seat 28 in which the throttle valve 29 is adapted to be moved back and forth through the outwardly extending pin 30. The limit screws 30^a and 31^a control the stroke of the valve in both directions. An essential feature of this valve seat is that the port therethrough is divided by a substantially wedge-shaped bridge 31, the air inlet side 32 of said port being unobstructed and substantially in a semi-circular form, while the vapor side 33 is partially closed by said tapering bridge whereby the proportion of vapor admitted through this port grows gradually less as compared with the air. By this arrangement the mixture is positively controlled and regulated so that the faster the engine runs the greater the proportion of air to that of the gasolene, the percentage being in a fixed ratio.

In order that the engine may have mixture of sufficient richness to enable it to run at a very slow speed, a hole 35 has been provided through the valve which is adapted to communicate through into the vapor port when the valve is nearly closed. The end of an adjustable screw 36 is adapted to enter said hole from the end of the valve and regulate its size so that the carbureter may be adjusted to different engines to supply exactly the necessary quantity of vapor to control the speed of the same.

The needle valve 8 is threaded at 38 and provided with a head 37 so that its point 39 may be adjusted to nicely regulate the flow of hydrocarbon through the supply nozzle 7. A top plate 40 having a central outlet pipe 41 is designed to cover the valve and valve channel and is threaded on its outer end onto which the engine supply pipe is connected.

One of the great draw-backs in the use of gasolene engines is the fact that oftentimes considerable difficulty is experienced in trying to crank or start the same, which difficulty is largely due to the fact that the cylinders do not receive a mixture rich enough to ignite readily. To obviate this difficulty and provide a mixture of sufficient richness for this purpose a circular well collar 42 is attached, by soldering, screws or other suitable means, to the lower end of the float chamber 1 and arranged to surround the central draft flue 2 through said chamber, leaving a narrow aperture 43 through which the gasolene is drawn from the circular chamber 44 within the collar by the suction of all of the entering air, thereby providing a mixture of sufficient richness to enable the engine to be started without difficulty.

It is found in practice that the air drawing rapidly up through the flue 4 over the slotted portion 43 causes a whistling sound which is objectionable, and in order to obviate this noise a wire 45 wound helically in a tubular form and bent in a circle, in the manner illustrated in Fig. 9, is inserted into the circular chamber 44, thus breaking up the rapid circulation of the air currents through said chamber and effectually stops the noise.

The operation of our improved carbureter may be more fully described as follows: In starting the engine the float chamber to the carbureter is flooded by raising the end of

the valve spindle 23, allowing the gasolene to run out of the jet nozzle 7 and down the side walls of the tube where it follows around the metal and finally fills the circular well 44 around the lower end of the air flue. As the engine is then turned over all of the air drawn in is highly charged with the gasolene vapor presenting a rich explosive mixture to the cylinders, enabling the engine to be started with greatest ease. Both the air and the gas ports are arranged side by side and controlled by the action of a single valve, the shape of the vapor port in said valve being carefully figured out and fixed so that both the air and the vapor openings are at all times in exactly the proper ratio one to the other, insuring the proper mixture in the cylinders at all speeds from the highest to the lowest.

It is obvious, that the vapor for the mixture is obtained by the currents of air passing around the nozzle 5 as the latter discharges the hydrocarbon.

By the use of this device an engine is adapted to run at any speed from the very lowest to the very highest with the greatest possible economy.

The device is very simple and practical in construction and extremely efficient in its operation and by its use the efficiency of the hydrocarbon engine is greatly increased.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. A carbureter comprising a hydrocarbon reservoir, a flue extended therethrough, a partition extending longitudinally through said flue to form an air passage and a carbureted air passage, means for supplying hydrocarbon vapor to the latter passage, and a single valve controlling both passages simultaneously, said partition being provided with means coöperating with said valve for permitting the flow of air and vapor to vary in a predetermined ratio, said valve having a port communicating with the carbureted air passage when nearly closed.

2. A carbureter comprising a hydrocarbon reservoir, a flue extended therethrough, a partition extended longitudinally through said flue to form an air passage and a carbureted air passage, means for supplying hydrocarbon vapor to the latter passage, and a single valve controlling both passages simultaneously, said partition being provided with means coöperating with said valve for permitting the flow of air and vapor to vary in a predetermined ratio, said valve being provided with an auxiliary port arranged to communicate with the carbureted air passage when the valve is nearly closed.

3. A carbureter comprising a flue, a partition extended longitudinally therethrough to form air and carbureted air passages, a feed nozzle located in the carbureted air passage, means for regulating the flow through said nozzle to produce the maximum engine speed, a slide valve operating across said flue and provided with ports controlling said air and hydrocarbon passages, and adjustable means for regulating the flow of vapor through said hydrocarbon port, whereby the mixture may be regulated to produce the minimum engine speed.

4. A carbureter provided with an air passage and a carbureted air passage provided with adjacent outlet openings, the outlet opening of the carbureted air passage being tapered in plan, a hydrocarbon feed nozzle in said carbureted air passage, means for regulating the flow from said nozzle, and a valve provided with a single port arranged to control the outlet openings of both passages, said valve being also provided with an auxiliary port arranged to communicate with said carbureted air passage.

5. A carbureter comprising a hydrocarbon reservoir, a flue extended therethrough, a partition extending longitudinally through said flue to form an air passage and a carbureted air passage, means for supplying hydrocarbon vapor to the latter passage, and a single valve controlling both passages simultaneously, said partition being provided with means coöperating with said valve for permitting the flow of air and vapor to vary in a predetermined ratio, said valve being also provided with an auxiliary port arranged to communicate with the carbureted air supply, and means for regulating the size of said auxiliary port.

6. A carbureter comprising a hydrocarbon reservoir, a flue extended therethrough, a partition extending longitudinally through said flue to form an air passage and a carbureted air passage, provided with adjacent outlets separated by a tapered bridge, means for supplying hydrocarbon vapor to the carbureted air passage, and a valve provided with a single port for simultaneously controlling both of said outlets, whereby the flow of air and hydrocarbon is varied in a predetermined ratio.

7. A carbureter comprising a hydrocarbon reservoir, a flue extended therethrough, a partition extending longitudinally through said flue to form an air passage and a carbureted air passage provided with adjacent outlets separated by a tapered bridge, means for supplying hydrocarbon vapor to the carbureted air passage, and a valve provided with a single port for simultaneously controlling both of said outlets, said valve being also provided with an auxiliary port arranged to communicate with the carbureted air supply.

8. A carbureter provided with a draft flue, a fuel receiving well provided with a chamber encircling said flue whereby the

entering air may be highly charged with vaporized fuel to facilitate starting the engine, and means in said chamber for breaking up the air currents circulating through the same to prevent a noise from being made by the air passing rapidly by the entrance to said well.

9. A carbureter provided with a draft flue, a fuel receiving well provided with a chamber encircling said flue whereby all of the entering air may be highly charged with vaporized fuel to facilitate starting the engine, and a coil of wire arranged in said chamber for breaking up the air currents circulating through the same to prevent a noise being made by the air passing rapidly past the entrance to said well.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES A. McHARDY.
CHARLES A. POTTER.

Witnesses:
HOWARD E. BARLOW,
E. I. OGDEN.